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**HEALTH PHYSICS AND SAFETY ORGANIZATION (OVERVIEW OF THE
ORGANIZATION)
(7/13/54)**

(From Box #12-2-5-28)

Compiled by
S. G. Thornton
Environmental Management Division
OAK RIDGE K-25 SITE
for the Health Studies Agreement

April 1, 1995

Oak Ridge K-25 Site
Oak Ridge, Tennessee 37831-7101
managed by MARTIN MARIETTA ENERGY SYSTEMS, INC.
for the U.S. DEPARTMENT OF ENERGY
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Technical Information Office
Oak Ridge K-25 Site
Date

HEALTH PHYSICS
WATER AND MUD SAMPLING

1. At the request of the department the Laboratory Division takes routine samples of the plant water supply and sewage disposal.
2. The findings are sent in on a laboratory analysis sheet and evaluated for importance.
3. If the findings indicate a problem a follow up is made in the field, X-10 or Y-12 as the case might be to determine the cause or history behind them.
4. For record purposes, a notebook of the laboratory results is maintained for both the water and mud samples; also the evaluation of results are maintained. The month by month figures are plotted on a graph.
5. This material is used in the monthly highlights, the quarterly letters and the quarterly reports.

HEALTH PHYSICS
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HEALTH PHYSICS

ROUTINE SURVEY EVALUATION (ALPHA, BETA AND GAMMA)

Following the completion of a radiation survey

1. The original copy of the area survey is routed through the field supervisor to the statistics section ^{where} and the information ^{is} recorded.
2. The yellow copy of the survey is sent to the engineer concerned for evaluation of findings and necessary follow up. This copy is then returned to the surveyor. *and retained in surveyor's records until the next survey is made.*
3. Any important findings are explained in the permanent record book by the investigating engineer.
4. This material is used in the highlights report, quarterly report and Divisional letters.

HEALTH PHYSICS

RADIUM SOURCE INVENTORY

1. Once a quarter, plant groups who have sources send to the Safety and Health Physics Department the results of the three months surveys. If a problem exists with any of the sources the engineer assigned will investigate the conditions.
2. Once a year the Safety and Health Physics Department surveys and inventories all radium sources for leakage.
3. This information is used in quarterly letters, quarterly reports and monthly highlights. *It is also used for reporting the general condition of sources once a year.*

HEALTH PHYSICS

FILM BADGE EXPOSURES

1. If a film badge or film ring shows over P.A.L. exposure to either beta or gamma radiation, an over P.A.L. exposure report is initiated for investigation by the engineer concerned.

2. If the over P.A.L. exposure is above 5 R an immediate notification to supervision is made so that employee may be removed from any radiation field.

3. As set forth in the departmental procedure on over P.A.L. exposure a form letter to supervision is initiated to describe the findings and recommend the time necessary to restrict the employee from penetrating radiation fields.

(4) The investigation mentioned above is handled in much the same manner as any other accident investigation. The facts thus established may be reported to plant or filed for reference.

5. This information is used in the monthly highlights, the quarterly report and the quarterly letters.

HEALTH PHYSICS

FILM BADGE EXPOSURES

When an over P.A.L. film badge or film ring
1. ~~If a film badge or film ring shows over P.A.L. exposure to either beta or gamma radiation,~~ *a report is made to the engineer concerned.* an over P.A.L. exposure report is initiated for investigation by the engineer concerned.

2. ~~The over P.A.L. exposure is above 5 R an immediate notification to supervision is made so that the employee may be removed from any radiation field.~~ *made known*
restricted in accordance with the established procedure.

3. As set forth in the departmental procedure on over P.A.L. exposure, a form letter to supervision is initiated to describe the findings and recommend the time necessary to restrict the employee from penetrating radiation fields.

(4) The investigation mentioned above is handled in much the same manner as any other accident investigation. ~~The facts thus established may be reported to plant or filed for reference.~~

5. This information is used in the monthly highlights, the quarterly report and the quarterly letters.

However if the over P.A.L. exposure is in excess of one roentgen, a formal investigation is held and a plant report is prepared.

HEALTH PHYSICS

FILM BADGE HANDLING

1. On Wednesday the film badges and rings are marked by X-ray and distributed to prescribed locations in accordance with supervisory requests.
2. Each Thursday the old badges are ~~removed~~ ^{picked up} for developing and new film is replaced in the badge container for the next week.
3. The entire day of Friday is spent developing the film; ~~at~~ the same time the control film mentioned above are ^{also} developed. (This is now being done at Y-12).
4. Monday is spent interpreting the films. All over P.A.L. exposures are recorded in the statistical section and in each case the engineer concerned is notified so that an investigation may be made.
5. Several odds and ends of things are completed on Tuesday. The respective control film are exposed; the film badges and rings are prepared for distribution; I.B.M. reports are made; any other work not completed is finished.
6. Miscellaneous I.B.M. record cards are kept in I.B.M. office; exposed film are kept in ~~office~~ ^{in X-10} for a year then sent to plant records; new film ~~is~~ ^{and film is} sent from X-10 one week prior to use and is ~~automatically~~ ^{manually} charged to K-25; ~~film rings are also~~ ^{control film} sent from X-10, ~~mounted and~~ the empty ring is returned after film use.

HEALTH PHYSICS

Routine AUDIT SURVEYS

1. In order to know the conditions of equipment of an area or a job at a specific time, audit surveys ~~forms~~ ^{are designed to record} this information.
 2. The engineer assigned determines what information is needed to keep the department appraised of a group's health-physics program. This pertains to such things as frequency of survey and significance of location to be surveyed.
 3. The alpha contamination information of the audit report is filled in by observation and use of an alpha survey meter. (See procedure on radiation surveying)
 4. Observation and, a beta-gamma survey meter will ~~give the surveyor the tools necessary to fill in~~ the section on penetrating radiation. ^{environmental} ~~can easily be completed~~
 5. In order to determine the ^{environmental} air activity ~~conditions~~, either the high velocity sampler or the ^{Toronto} ~~fast~~ ^{results} ~~sampler~~ can be used to determine the ^{air} ~~alpha~~ activity. Observation permits the surveyor to determine if adequate respiratory protection is being worn. (See procedure on air sampling).
 6. ^{Personnel} ~~Personnel~~ contamination again calls for the use of observation and an alpha survey meter.
 7. The ultimate value to this survey hinges on the engineer evaluating the information and connecting it into a pattern showing good, ~~bad or indifferent~~ ^{of the group concerned} the attitude to the plant's program.
 8. This information is primarily of use for ~~general knowledge or~~ Divisional letters, ^{quarterly reports and monthly highlights.}
- ① In order to establish the extent and degree of ^{equipment} surface contamination and radiation levels, extent of airborne contamination, and extent of personnel contamination, routine audit surveys are conducted, ^{at a frequency} in accordance with the established ^{procedure and} ~~criteria~~ considering the engineer's evaluation and levels encountered.

SAFETY

CONSULTATION SERVICES

1. Consultation service is not a routine engineering activity, although it is an important field contact that will assist in carrying on the plant's safety and health physics program at the lowest level of supervision. Engineers do not contact supervision higher than that level just below that which reports to a division head.
2. The subjects discussed at such supervisory meetings are dependent upon existing conditions or problems. These may include the findings on a job, the groups program, or the improvement of some factor related to safety or health physics.
3. In as much as such contacts are a good sounding board of a supervisor's attitude, a brief of the discussion should be kept for record. Under no circumstances should a problem be rehashed with the same supervisor again and again, but it should be carried ~~on up~~ up. If the problem warrants, the material should be passed on up through his own supervision for handling.
4. This material has considerable value for the divisional letters.

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HEALTH PHYSICS

INSTRUMENTS

A. Departmental Instruments.

1. The March, 1954, inventory of instruments established an out of balance condition with Plant Property records. This was corrected by agreement.
2. A record card is kept on each instrument in a file. If an instrument is to be sent for repair, a Work Order is written and the respective card is so marked. The instrument is delivered and picked up by departmental employees.
3. A chart of factors that pertain to the cost of instruments is kept up to date for quick reference.
4. If it is desired to loan an instrument to some other group, this is done on a property transfer.
5. The instruments are checked once a week for accurate operation.

B. Plant Instruments.

1. When better instruments are available, the Safety and Health Physics Department acts in conjunction with the Engineering Department to determine the advisability of using them.
2. Field checks are made from time to time to determine if an area's equipment is in operating condition.

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HEALTH PHYSICS

AIR SAMPLING

1. Air sampling whether it is routine or for job audit purposes is accomplished through the use of either a high velocity sampler or a Gast sampler dependent upon the accuracy desired.
2. No matter which sampler is used, the engineer must locate the equipment so that the best results are obtained.
3. High velocity samplers can be obtained from room 137A of K-1001 Building; the Gast samplers are located in the laboratory room at K-301-4 Building.
4. Before taking a sample, a series of numbers should be assigned to the job according to the desired number of samples. Either the Statistical Section issues these numbers or the field supervisor issues HPX numbers. The numbers are used for laboratory control; however, only those numbers issued by the Statistical Section are used in determining plant levels.
5. Air sampling paper Whatman #41 is handled in a petre dish to prevent outside contamination and numbered and dated according to the list mentioned above.
6. The sampling is carried out as desired by the engineer concerned; the air sampling is recorded on the audit survey sheet then the air samples are taken to the laboratory for analysis.
7. The laboratory results are sent to the ~~XXXXXX~~ Statistical Section where the findings are recorded and the analysis is then sent on to the engineer to complete the survey form.
8. This information is used in the divisional letters, the quarterly reports, and the monthly highlights.

SAFETY

INJURY AND ACCIDENT INVESTIGATION

1. Certain injuries, fires, property damages, motor vehicle accidents, equipment failures, and radiation exposures are investigated according to plant procedure; however, any other incidents in the opinion of the engineer concerned is significant may be investigated.
2. The plant accidents that are reported are done so by various means. Major injuries are called in by Plant Medical; some supervisors call in concerning property damage, equipment failure, and motor vehicle accidents; radiation exposures are taken from film developing records; the Fire Department reports important fires. A preliminary incident report is initiated on all major injuries and all over-P.A.L. film badges. This preliminary report may or may not be used in all investigations depending upon the engineer concerned.
3. A preliminary investigation is made of the accidents mentioned above.
4. If the incident is serious, a formal investigation is made, and the members of the committee are designated by the responsible division head or his authorized representative.
5. A report of the meeting is prepared for either file or supervisory distribution. This decision is based on plant procedure and the value of the incident to other plant groups.
6. Information concerning such accidents is kept in the Records Section.
7. This material is used in all types of reports.

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HEALTH PHYSICS

JOB STUDY

1. Job studies are made to comply with a departmental list of jobs ~~with~~ radiation problems ~~and as a result of~~ the responsible engineers decision to study a particular job.
2. The information is recorded on a job audit report. Each section of the report is filled in as follows:
 - a. Alpha contamination is completed by use of an alpha survey meter and general observation. (see procedure on radiation survey)
 - b. Penetrating radiation details are collected by using a beta gamma radiation survey meter and observation. (see procedure on radiation surveys)
 - c. The air activity section requires the use of either or both the high velocity sample or Cast sampler to obtain the data; the remainder is completed by observation. (see procedure on air sampling)
 - d. As in (a) above, the use of the alpha survey meter and observations are needed to complete the portion on personnel contamination.
3. The enigneer evaluates the information to determine how the group concerned is interested in complying with the plant program.
4. This information is used for information and divisional letters.

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STANDARD REFERENCE INFORMATION

1. Since there is no definite stipulation as to who originates and revises the various reference material for the plant, those groups which have a peculiar interest in some phase of the plant's activities assume this responsibility. The Safety and Health Physics Group either originates or assists in originating S.P.F.'s, W.S. and Emergency Procedures that pertain to its work and initiates all SP's since they are solely a function of the department.
2. Once the decision is made to develop or revise a procedure of some sort, one of the engineers is assigned the task of developing the material.
3. After the proposal has been accepted by departmental supervision, it is routed to other concerned supervision for their comment.
4. All comments that are felt to be worthwhile are added and the procedure is printed and signed by the responsible company representative.

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SAFETY

SUPERVISORY TRAINING

1. This particular aspect of the job overlaps to a certain extent the consulting services; however, this pertains primarily to supervisory training on some phase of safety and health physics activities.
2. In accordance with management decision, this is either a formal training program carried on through some group set up to do the training or through an informal periodic field contact in which the subject matter is discussed.
3. Following the training period, an evaluation as to the worth of the program should be made. This should include material, presentation, reaction of supervision, and the supervisor's attitude.
4. Supervisory training is carried on through certain phases of the promotion and education activities such as subscription to periodicals, training booklets, and representative statistics.

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SAFETY

PROMOTION AND EDUCATION

1. Promotion and Education is carried on to keep the various aspects of the Safety and Health Physics Program in front of both supervision and employees. This part of the work fits very closely with the training part of the program.
2. Two large sign boards mounting both a train to show plant accident picture and a place for slogans is used.
3. At the present, only 3 plant slogan boards are in service with the possibility of 3 more for the near future.
4. The Carbide Courier carries a routine scoreboard of man-hours worked since the last accident. Also, feature stories are published from time to time with the department furnishing only the technical assistance to the Courier staff.
5. Booklets and leaflets that are acceptable for promotion and education work are often purchased for distribution to plant supervision; this could also be extended to all plant employees.
6. Other miscellaneous efforts such as a yearly calendar, a monthly calendar insert, accident reports, and a monthly accident report round out this activity.

7/13/54

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ENGINEER.

H P -
 Safety -
 Fire protection Engng -
 Electrical -

A. H P
 Routine Survey Evaluation - Alpha & Beta -
 Filter Badge Exposures -
 Job Surveys -
 Water & Mud Sampling ✓
 Ra source inventory ✓
 Air sampling -
 Instrumentation ✓
 Film badge handling ✓
 Job Study ✓

B. Safety (one added Engng Required)
 1. Injury & Acc. Investigation ✓
 2. Consultation Services ✓
 3. Injury Training ✓
 4. Employee " ✓
 5. Prom. & Ed -
 6. Std Ref Info -
 7. H P's ✓
 8. Protective clothing ✓
 9. Driver Training ✓
 10. Audit survey evaluation ✓
 11. Sub. Contracts ✓
 12. Safety Audits ✓
 13. Special Assignments ✓
 14. Duty Review ✓

C. Fire Protection
 1. Drawg Review ✓
 2. Engng Consultation ✓
 3. New Installations ✓

D. Electrical
 1. Drawg Review 2. New Installations and